



Product Specifications and the DoD Experience



B20

Background

- **DESC first purchased B100 for USDA in 2000**
- **Military and FED/CIV Activities requested B20 to obtain EPACT Credits beginning in 2001**
- **B20 Purchase description first developed in April 2001**



Product Specifications and the DoD Experience



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- **DESC Purchase Description:**
- **Based on Army's CID A-A 59693**
- **Originally only Virgin Vegetable Oil Blendstock, now allows Yellow Grease**
- **Requires product to be Fully Blended prior to delivery**

C16.27 FUEL, BIODIESEL (B20) (DESC MAR 2004)

Offered product shall conform to the following requirements that define a fuel suitable for use in automotive diesel engines.

(a) **PRODUCT COMPOSITIONAL REQUIREMENTS.** Product shall consist of a blend of 20 percent (plus or minus one percent) mono-alkyl esters of long chain fatty acids derived from virgin vegetable oil blendstock and/or yellow grease blendstock conforming to the requirements of ASTM D 6751 and 80 percent minimum low sulfur diesel fuel oil conforming to ASTM D 975, grade low sulfur number 1-D or grade low sulfur number 2-D.

(b) **PRODUCT PERFORMANCE REQUIREMENTS.** The finished biodiesel blend shall conform to the following requirements:

TEST	METHOD	VALUE
1. Appearance	ASTM D 4176, Procedure 1	Clear & Bright
2. Acid Number, mg KOH/g	ASTM D 664	0.2 max.
3. Density @ 15°C, kg/L or API Gravity @ 60°F	ASTM D 4052 ASTM D 1298	Report
4. Viscosity, mm ² /S at 40°C	ASTM D 445	1.3 - 4.1
5. Flashpoint, °C	ASTM D 93	Apr - Sep: 52 min. Oct - Mar: 38 min.
6. Cloud point, °C OR Cold Filter Plugging Point, °C	ASTM D 2500 ASTM D 6371	see (c) below see (c) below
7. Sulfur Content, mass %	ASTM D 2622	0.05 max.
8. Distillation Temperature, °C 10% point, °C 50% point, °C 90% point, °C, evaporated	ASTM D 86	Report Report 338 max.
9. Carbon Residue on 10% bottoms, mass %	ASTM D 524	0.35 max.
10. Cetane Number	ASTM D 613	40 min.
11. Ash Content, mass%	ASTM D 482	0.01 max.
12. Water and Sediment, volume%	ASTM D 2709	0.05 max.
13. Copper Corrosion, 3 hours @ 50°C	ASTM D 130	No. 3 max.

(c) **PRODUCT LOW TEMPERATURE PERFORMANCE.** The lower temperature performance of the B20 shall be defined by one of the following two properties: Cloud Point or Cold Filter Plugging Point (CFPP). Unless a more restrictive cloud point limit is specified in the contract schedule, the cloud point tested in accordance with ASTM D 2500 shall be equal to or lower than the tenth percentile minimum ambient temperature in the geographical area and seasonal timeframe in which the B20 is to be used, as specified in Appendix X4 of ASTM D 975. Unless a more restrictive CFPP limit is specified in the contract schedule, the maximum CFPP of the B20 shall be a minimum of 10 degrees Celsius below the tenth percentile minimum ambient temperature in the geographical area and seasonal timeframe in which the B20 is to be used, when tested in accordance with ASTM D 6371.

(d) **BLENDING.** Product shall be blended prior to delivery. Manifold blending at time of delivery and blending in the receipt tank is not permitted. The resultant blended product must meet all performance requirements specified in the contract.

(e) **ENVIRONMENTAL PROTECTION AGENCY (EPA) REGISTRATION.** B100 product must be EPA registered in accordance with 40 CFR Part 79, Registration of Fuels and Fuel Additives. The Contractor shall provide a copy of the EPA registration letter to the Contracting Officer at the time of offer.

(DESC 52.246-9FEL)



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Significant Operational Issues

- **Low Temperature Performance:**
 - **B20 More Susceptible to Cold Flow Problems**
 - **Cold Filter Plugging Point (CFPP, ASTM D6371) is More Accurate Test than Cloud Point**
 - **Improvements Possible with Cold Flow Improver Additives**



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Significant Operational Issues

- **Storage Stability:**
 - **Stability varies depending on feedstock and processing**
 - **Poor Stability Increases Acid No., Viscosity, Gum and Sediment; Can be Improved with Anti-Oxidants**
 - **Six Month Storage Stability Limit**



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Significant Operational Issues

- **Lubricity:**
 - **Biodiesel Provides Superior Lubricity over Conventional Diesel Fuels**
 - **As Little as 0.25% Biodiesel Blended in Diesel can Significantly Increase Lubricity.**
 - **Some Fleets Use 2% Blends (B2) instead of Other Lubricity Additives**



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ASTM SPECIFICATION

- **Being Drafted by DESC-BP in Coordination with ASTM**
- **Needed by Fuel and Auto Industries for Certification and Warranty Purposes**
- **Needed by the California Air Resources Board (CARB) for its B20 Regulations**
- **Will Lead to More Consistent Quality in Products**



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ASTM SPECIFICATION

- **Similar to D 975 for Conventional Diesel**
- **Single Grade, Low Sulfur (500 ppm max)**
- **Acid Number Requirement of 0.2 mg KOH/g max**



Product Specifications and the DoD Experience



E85

Background

- **DESC first purchased E85 for the Navy in 2000**
- **Purchased using ASTM Specification D 5798**



Product Specifications and the DoD Experience



E85

Significant Operational Issues

- **Miscibility with Water**
- **Corrosiveness**
- **Vapor Pressure**



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QUESTION

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